

Storm Drainage Report

For
80 Broadway
Arlington



Date: September 6, 2022

By: *Peter Gammie, P.E.*
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Introduction

This report discusses the stormwater management system and analysis for the redevelopment at 80 Broadway, in Arlington MA.

The proposed development includes the razing of the existing commercial building and constructing a four story mixed use facility. The first and second floors will be commercial (retail) and third and fourth floors to house four residential units. Parking at grade will accommodate seven spaces including one handicap space. The existing curb cut on Broadway will be modified, narrowing it to a single 14' opening. The curb cut on Winter St. will be closed. The total disturbance is less than one acre, therefore the NPDES General Permit is not required. The proposed stormwater system meets all the City's requirements. The proposed storm drainage systems reduce runoff for all events including the 100 year (24 hr) event. New utilities include domestic water, fire, sewer, gas and electric services.

Oil/Gas Separator

The proposed parking area consists of a total of seven spaces. Only one of them is completely covered by roof area. Two of the spaces lie completely out side the roof area and four are only partially covered. Given this, it is my opinion that an oil/gas separator is not necessary.

Stormwater Management

The site is approximately 6,770 SF (0.16 acre) and has a very gently sloping topography. There are very few existing trees, however the proposed landscape improvements will significantly increase the number of trees, shrubs and plantings. Where possible existing trees will be preserved.

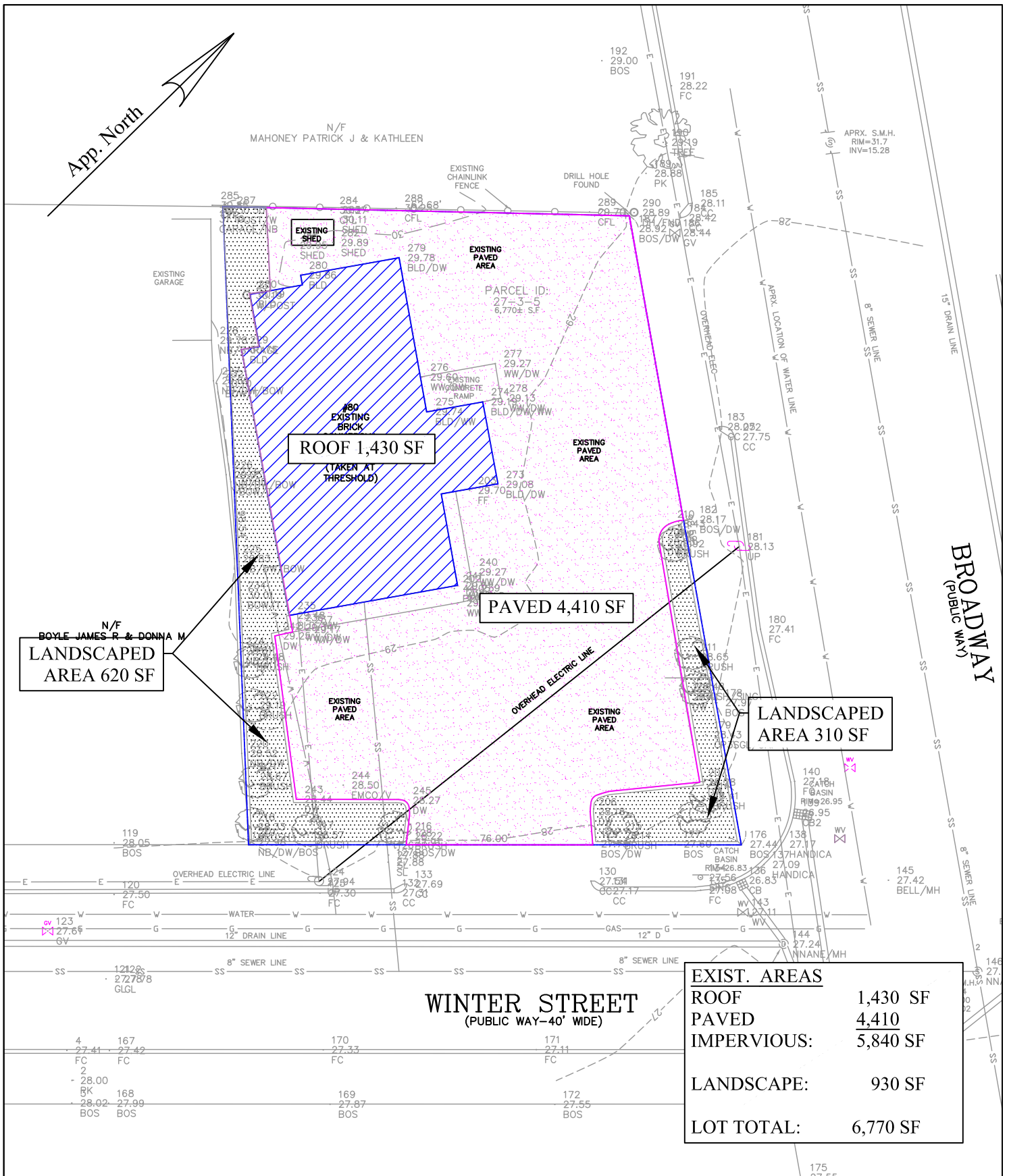
The proposed stormwater management system consists of three systems located under the parking area. Runoff from the roof areas and the parking lot is collected via roof area drains and gutters on the building and catch basins in the parking lot. These systems have been designed to store and infiltrate all of the contributing runoff for storm events up to and including the 100 yr (24 hr) event. With these three systems we have almost completely eliminate off site runoff.

The attached D-1 and D-2 sheets (below) show the existing and proposed surface areas. The proposed work decreases impervious surfaces by 115 sf. The attached HydroCAD report shows that the systems completely contain and infiltrate all storm events up to and including the 100 year (24hr) event.

INFILTRATION SYSTEM #1&2 – This system consists of a single bed of crushed stone (17.86' x 11.00' x 3.50') located under the parking area along the northwest side. Embedded in the crushed stone bed are 4 StormTech Sc740 Chambers.

INFILTRATION SYSTEM #3 – This system consists of six StormTech SC740 chambers in crushed stone bed (24.98' x 11.00' x 3.50'). This system is located under the parking area along the west side of the parking area.

All of the roof runoff will be collected via area drains, gutters and downspouts and piped into the infiltration systems. All of the parking area runoff will be collected via catch basins and piped into the infiltration system. There is no outlet from this system, no overflow to the municipal storm drainage system.



D-1

Existing Drainage Areas

80 Broadway
Arlington, MA

Scale: 1"=20'

Date: 08/26/22

COLUMBIA DESIGN GROUP, LLC

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INFILTRATION SYSTEM #1&2

2 Chambers/Row = 17.86' Base Length

2 Rows = 11.00' Base Width

Height = 3.50' Field Height

4 Chambers x 45.9 cf = 183.8 cf Chamber Stor.

687.5 cf Field - 183.8 cf Chambers = 503.7 cf Stone x 40.0% Voids = 201.5 cf Stone Storage

Chamber Storage + Stone Storage = 385.2 cf

Overall System Size = 17.86' x 11.00' x 3.50'

INFILTRATION SYSTEM #3

3 Chambers/Row = 24.98' Base Length

2 Rows = 11.00' Base Width

Height = 3.50' Field Height

6 Chambers x 45.9 cf = 275.6 cf Chamber Stor.

961.6 cf Field - 275.6 cf Chambers = 686.0 cf Stone x 40.0% Voids = 274.4 cf Stone Storage

Chamber Storage + Stone Storage = 550.0 cf

Overall System Size = 24.98' x 11.00' x 3.50'

Soils & Ground Water

Soils information is obtained from NRCS Web Soils Survey indicates this area to be 626 B-Merrimac Urban land.

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Soil test to determine the soil profile and depth to ground water will be performed at each system to confirm site conditions. For the purpose of this analysis we have assumed a very conservative hydraulic soil group HSG A, which has an associated Rawls infiltration rate of 2.41 in/hr. The seasonal high ground water is estimated to be well below the bottom of the two infiltration systems.

Recharge Target Depth by Hydrologic Soil Group

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

Rawls Rates

Drainage Calculations

Storm drainage design manages runoff and reduces both peak flows and volume for all storm events. The HydroCAD model is setup to evaluate the entire site taking into consideration both pervious and impervious surfaces. The results are summarized below.

Table 2 Volume of Discharge (cuft)

Design Storm	Design Point 1	
	Pre-	Post-
2 year	1356	37
10 year	2238	107
25 year	2937	176
100 year	4383	341

Table 3 Peak Rate of Discharge (cfs)

Design Storm	Design Point 1	
	Pre-	Post-
2 year, 3.16"	0.40	0.01
10 year, 4.77"	0.63	0.03
25 year, 6.03"	0.82	0.05
100 year, 8.62"	1.19	0.10

As mentioned, infiltration each system completely store and infiltrate all runoff from the impervious areas being collected, which included all roof and parking areas.

Conclusion

The proposed development introduces improved landscaping as well as a storm water management system that provides onsite mitigation for the difference between the existing and proposed conditions.

Soil Map—Middlesex County, Massachusetts



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

8/24/2022
Page 1 of 3

Middlesex County, Massachusetts

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9

Elevation: 0 to 820 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent

Urban land: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Backslope, footslope, summit, shoulder

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand

2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent

Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low
(0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, crest, head slope, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, dunes, outwash plains, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex

Appendix 'A'

OPERATION AND MAINTENANCE PLAN/ Long Term Pollution Prevention Plan

for

***80 Broadway.
Arlington, MA***

The proponent/owner is responsible for the operation and maintenance of the proposed stormwater management system as follows:

Stormwater Management System Owners: _____

Party Responsible for the O & M: Home owner

Schedule for Implementation: see O & M Schedule

Plan Showing the location of all Stormwater BMPs: See Site Plan Titled – Grading & Drainage Plan by Peter Gammie

Log Form: See below.

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan will be implemented generally as follows. The Owner may require the site contractor to prepare and submit specific plans if required.

Narrative: Multiple erosion and sedimentation control devices will be implemented to prevent erosion during and after construction. The following erosion and sediment controls will be installed for this project:

- Initially, an erosion control will be installed at the limit of work along the down gradient site borders.
- Construction entrance apron pads will be constructed at the main site access to prevent the tracking of sediment on vehicle tires from transport onto adjacent streets if necessary.
- Check dams and water quality swales will be installed as needed.
- During construction, cut and fill slopes will be stabilized immediately upon completion with loam, hydroseeding and/or erosion control blankets.

Names of Persons or Entity Responsible for Plan Compliance: As part of the Submittal Process, the General Contractor shall submit the names of responsible parties.

Construction Period Pollution Prevention Measures: Erosion control measures as shown on the plan and/or as are standard practice shall be installed accordingly. Best Management Practices

shall be implemented such as the locations for vehicle maintenance and refueling, storage of supplies, and refuse disposal.

Erosion and Sedimentation Control Plan Drawings: Contractor to install per plan and/or standard practice.

Drawings and specifications for erosion control BMPs: Contractor may be requested to submit his plan for proposed sequencing of the work and the associated locations for diversion swales, erosion control dikes and berms, and/or temporary sedimentation basins.

Vegetation Planning: Landscaping to be installed per plan.

Construction Sequencing Plan: Contractor may be required to submit his plan for proposed sequencing of the work and the associated locations for diversion swales, erosion control dikes and berms, and temporary sedimentation basins.

Post construction O & M:

After construction, the site shall be inspected to assure that the landscaping is stabilized. Once stabilized, then the perimeter erosion control devices shall be removed.

Infiltration System:

The proposed stormwater management for this project consists of leaching fields containing StormTech chambers in a crushed stone bed. The system requires little maintenance, however should be checked for proper functioning on an annual basis. If excessive buildup of sediment or prolonged periods of standing water are found, the systems will require maintenance by a company familiar with the long-term maintenance and repair of these types of systems.

The infiltration system will be inspected for debris buildup and cleaned as needed. The inspector shall note the date of the inspection along with the condition of the structures and amount of trash, debris and/or sediment. Based upon the observed condition, the inspector shall make recommendations based on previously approved criteria for the cleaning of the structure.

Roof gutters and down spouts should be cleaned twice per year and more often if necessary. The overflow components of the subsurface stormwater management system will must also be inspected on an annual basis and any sediment or debris removed.

Snow Storage - Proper snow management practices will be implemented to minimize shock and pollutant loading impacts. Plowed snow will be placed in landscaped areas where it can slowly melt. If snow removal is required, a licensed operator shall dispose of snow in accordance with local and state regulations.

Illicit Discharges: Property Management acknowledges that other than driveway lot/landscaping runoff from rain/storm events, no other discharges are permitted to drain to the stormwater system. Yearly inspections will be made to assure no illicit connections exist.

Other site areas, including the overflow outlets, shall be inspected for erosion and repairs implemented as needed and with the frequency shown in the attached schedule.

Accepted By:

Date:

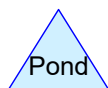
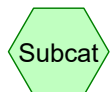
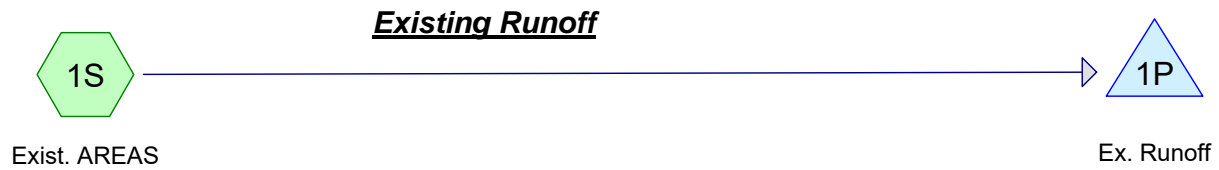
Stormwater Management Operation and Maintenance Schedule

Property: _____

Date: _____

BMP	Frequency	Date Performed	Comments	Cleaning/ Repair Needed? Yes/No	Date of Cleaning/ Repair	Performed By
<u>Subsurface Infiltration System</u> Inspect for proper functioning	After every major storm during first three months and twice per year thereafter.					
<u>Trench Drains & Catch Basins</u> Inspect for debris buildup	Cleaned and maintained as needed, min twice per year					
<u>Roof Drains & Gutters</u> Inspect for proper functioning	Cleaned and maintained as needed, min twice per year					

*Clear leaves, acorns, and other debris out of gutters (avoid washing or pushing leaves, acorns, twigs, and other small debris into downspout inlet). Repair gutters and downspouts as needed to promote proper drainage into the recharge systems.



80 Broadway - prop and exist II

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
930	61	>75% Grass cover, Good, HSG B (1S)
4,410	98	Paved Parking Area (1S)
1,430	98	ROOF (1S)
6,770	93	TOTAL AREA

80 Broadway - prop and exist II

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NRCC 24-hr D 2-Year Rainfall=3.16"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Exist. AREAS

Runoff Area=6,770 sf 86.26% Impervious Runoff Depth>2.41"

Tc=5.0 min CN=93 Runoff=0.40 cfs 1,357 cf

Pond 1P: Ex. Runoff

Peak Elev=40.00' Storage=1,356 cf Inflow=0.40 cfs 1,357 cf

Outflow=0.00 cfs 0 cf

Total Runoff Area = 6,770 sf Runoff Volume = 1,357 cf Average Runoff Depth = 2.41"
13.74% Pervious = 930 sf 86.26% Impervious = 5,840 sf

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NRCC 24-hr D 2-Year Rainfall=3.16"

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Summary for Subcatchment 1S: Exist. AREAS

Runoff = 0.40 cfs @ 12.11 hrs, Volume= 1,357 cf, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

	Area (sf)	CN	Description
*	1,430	98	ROOF
*	4,410	98	Paved Parking Area
	930	61	>75% Grass cover, Good, HSG B
	6,770	93	Weighted Average
	930		13.74% Pervious Area
	5,840		86.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1P: Ex. Runoff

Inflow Area = 6,770 sf, 86.26% Impervious, Inflow Depth > 2.41" for 2-Year event

Inflow = 0.40 cfs @ 12.11 hrs, Volume= 1,357 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 1,356 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

80 Broadway - prop and exist II

NRCC 24-hr D 10-Year Rainfall=4.77"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Exist. AREAS

Runoff Area=6,770 sf 86.26% Impervious Runoff Depth>3.97"

Tc=5.0 min CN=93 Runoff=0.63 cfs 2,239 cf

Pond 1P: Ex. Runoff

Peak Elev=40.00' Storage=2,238 cf Inflow=0.63 cfs 2,239 cf

Outflow=0.00 cfs 0 cf

Total Runoff Area = 6,770 sf Runoff Volume = 2,239 cf Average Runoff Depth = 3.97"
13.74% Pervious = 930 sf 86.26% Impervious = 5,840 sf

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NRCC 24-hr D 10-Year Rainfall=4.77"

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Summary for Subcatchment 1S: Exist. AREAS

Runoff = 0.63 cfs @ 12.11 hrs, Volume= 2,239 cf, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.77"

	Area (sf)	CN	Description
*	1,430	98	ROOF
*	4,410	98	Paved Parking Area
	930	61	>75% Grass cover, Good, HSG B
	6,770	93	Weighted Average
	930		13.74% Pervious Area
	5,840		86.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1P: Ex. Runoff

Inflow Area = 6,770 sf, 86.26% Impervious, Inflow Depth > 3.97" for 10-Year event

Inflow = 0.63 cfs @ 12.11 hrs, Volume= 2,239 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 2,238 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

80 Broadway - prop and exist II

NRCC 24-hr D 50-Year Rainfall=7.21"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Exist. AREAS

Runoff Area=6,770 sf 86.26% Impervious Runoff Depth>6.37"

Tc=5.0 min CN=93 Runoff=0.99 cfs 3,596 cf

Pond 1P: Ex. Runoff

Peak Elev=40.00' Storage=3,594 cf Inflow=0.99 cfs 3,596 cf

Outflow=0.00 cfs 0 cf

Total Runoff Area = 6,770 sf Runoff Volume = 3,596 cf Average Runoff Depth = 6.37"
13.74% Pervious = 930 sf 86.26% Impervious = 5,840 sf

80 Broadway - prop and exist II

NRCC 24-hr D 50-Year Rainfall=7.21"

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Summary for Subcatchment 1S: Exist. AREAS

Runoff = 0.99 cfs @ 12.11 hrs, Volume= 3,596 cf, Depth> 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.21"

	Area (sf)	CN	Description
*	1,430	98	ROOF
*	4,410	98	Paved Parking Area
	930	61	>75% Grass cover, Good, HSG B
	6,770	93	Weighted Average
	930		13.74% Pervious Area
	5,840		86.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1P: Ex. Runoff

Inflow Area = 6,770 sf, 86.26% Impervious, Inflow Depth > 6.37" for 50-Year event

Inflow = 0.99 cfs @ 12.11 hrs, Volume= 3,596 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 3,594 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

80 Broadway - prop and exist II

NRCC 24-hr D 100-Year Rainfall=8.62"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Exist. AREAS

Runoff Area=6,770 sf 86.26% Impervious Runoff Depth>7.77"

Tc=5.0 min CN=93 Runoff=1.19 cfs 4,385 cf

Pond 1P: Ex. Runoff

Peak Elev=40.00' Storage=4,383 cf Inflow=1.19 cfs 4,385 cf

Outflow=0.00 cfs 0 cf

Total Runoff Area = 6,770 sf Runoff Volume = 4,385 cf Average Runoff Depth = 7.77"
13.74% Pervious = 930 sf 86.26% Impervious = 5,840 sf

80 Broadway - prop and exist II

NRCC 24-hr D 100-Year Rainfall=8.62"

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Summary for Subcatchment 1S: Exist. AREAS

Runoff = 1.19 cfs @ 12.11 hrs, Volume= 4,385 cf, Depth> 7.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.62"

	Area (sf)	CN	Description
*	1,430	98	ROOF
*	4,410	98	Paved Parking Area
	930	61	>75% Grass cover, Good, HSG B
	6,770	93	Weighted Average
	930		13.74% Pervious Area
	5,840		86.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1P: Ex. Runoff

Inflow Area = 6,770 sf, 86.26% Impervious, Inflow Depth > 7.77" for 100-Year event

Inflow = 1.19 cfs @ 12.11 hrs, Volume= 4,385 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

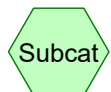
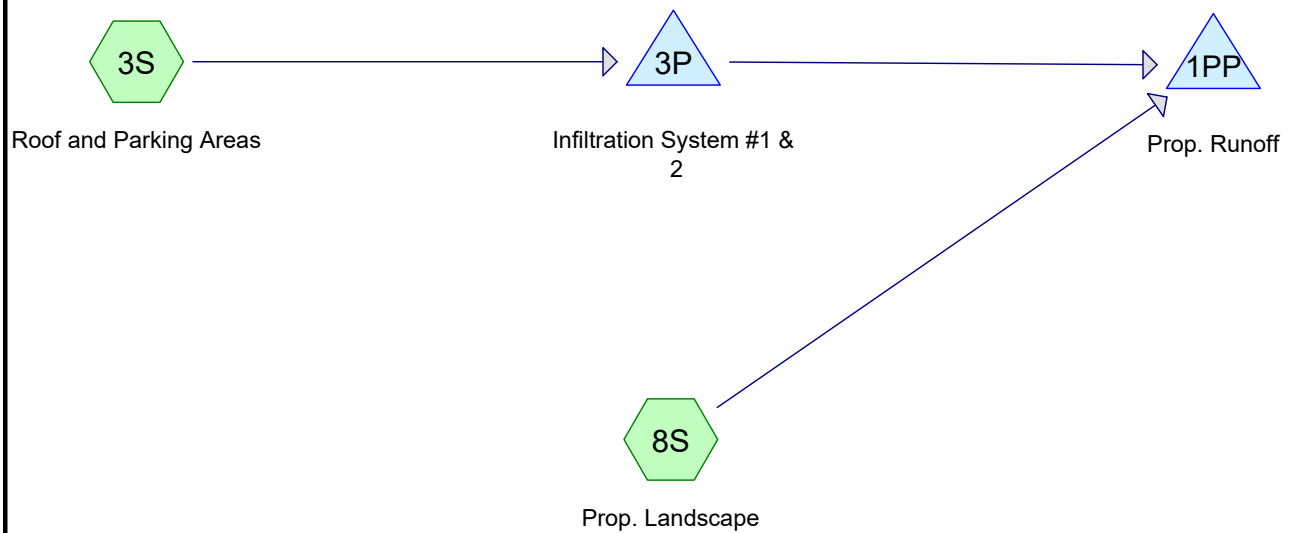
Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 4,383 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

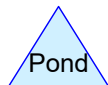
Proposed Runoff



Subcat



Reach



Pond



Link

Routing Diagram for 80 Broadway - prop and exist II
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80 Broadway - prop and exist II

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,045	61	>75% Grass cover, Good, HSG B (8S)
1,595	98	PARKING (3S)
4,130	98	ROOF AREA (3S)
6,770	92	TOTAL AREA

80 Broadway - prop and exist II

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NRCC 24-hr D 2-Year Rainfall=3.16"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Roof and Parking Areas Runoff Area=5,725 sf 100.00% Impervious Runoff Depth>2.93"
Tc=5.0 min CN=98 Runoff=0.37 cfs 1,396 cf

Subcatchment8S: Prop. Landscape Runoff Area=1,045 sf 0.00% Impervious Runoff Depth>0.43"
Tc=5.0 min CN=61 Runoff=0.01 cfs 37 cf

Pond 1PP: Prop. Runoff Peak Elev=40.00' Storage=37 cf Inflow=0.01 cfs 37 cf
Outflow=0.00 cfs 0 cf

Pond 3P: Infiltration System #1 & 2 Peak Elev=40.89' Storage=326 cf Inflow=0.37 cfs 1,396 cf
Discarded=0.06 cfs 1,394 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 1,394 cf

Total Runoff Area = 6,770 sf Runoff Volume = 1,433 cf Average Runoff Depth = 2.54"
15.44% Pervious = 1,045 sf 84.56% Impervious = 5,725 sf

80 Broadway - prop and exist II

NRCC 24-hr D 2-Year Rainfall=3.16"

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Summary for Subcatchment 3S: Roof and Parking Areas

Runoff = 0.37 cfs @ 12.11 hrs, Volume= 1,396 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

	Area (sf)	CN	Description
*	4,130	98	ROOF AREA
*	1,595	98	PARKING
	5,725	98	Weighted Average
	5,725		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment 8S: Prop. Landscape

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 37 cf, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

	Area (sf)	CN	Description
	1,045	61	>75% Grass cover, Good, HSG B
	1,045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1PP: Prop. Runoff

Inflow Area = 6,770 sf, 84.56% Impervious, Inflow Depth > 0.07" for 2-Year event

Inflow = 0.01 cfs @ 12.14 hrs, Volume= 37 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 37 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detension - Model

Summary for Pond 3P: Infiltration System #1 & 2

Inflow Area = 5,725 sf, 100.00% Impervious, Inflow Depth > 2.93" for 2-Year event
 Inflow = 0.37 cfs @ 12.11 hrs, Volume= 1,396 cf
 Outflow = 0.06 cfs @ 12.55 hrs, Volume= 1,394 cf, Atten= 84%, Lag= 26.4 min
 Discarded = 0.06 cfs @ 12.55 hrs, Volume= 1,394 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 40.89' @ 12.55 hrs Surf.Area= 665 sf Storage= 326 cf

Plug-Flow detention time= 33.8 min calculated for 1,391 cf (100% of inflow)

Center-of-Mass det. time= 33.0 min (792.2 - 759.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field A 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#2A	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#3C	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field C 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#4C	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#5B	40.00'	269 cf	11.00'W x 24.80'L x 3.50'H Field B 955 cf Overall - 281 cf Embedded = 673 cf x 40.0% Voids
#6B	40.50'	281 cf	ADS_StormTech SC-740 x 6 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group C created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 38.50'
#2	Primary	43.40'	6.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.40' / 40.00' S= 0.0850 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.06 cfs @ 12.55 hrs HW=40.89' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.00 cfs)

80 Broadway - prop and exist II

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NRCC 24-hr D 10-Year Rainfall=4.77"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Roof and Parking Areas Runoff Area=5,725 sf 100.00% Impervious Runoff Depth>4.53"
Tc=5.0 min CN=98 Runoff=0.57 cfs 2,161 cf

Subcatchment8S: Prop. Landscape Runoff Area=1,045 sf 0.00% Impervious Runoff Depth>1.23"
Tc=5.0 min CN=61 Runoff=0.03 cfs 107 cf

Pond 1PP: Prop. Runoff Peak Elev=40.00' Storage=107 cf Inflow=0.03 cfs 107 cf
Outflow=0.00 cfs 0 cf

Pond 3P: Infiltration System #1 & 2 Peak Elev=41.45' Storage=592 cf Inflow=0.57 cfs 2,161 cf
Discarded=0.07 cfs 2,159 cf Primary=0.00 cfs 0 cf Outflow=0.07 cfs 2,159 cf

Total Runoff Area = 6,770 sf Runoff Volume = 2,268 cf Average Runoff Depth = 4.02"
15.44% Pervious = 1,045 sf 84.56% Impervious = 5,725 sf

80 Broadway - prop and exist II

NRCC 24-hr D 10-Year Rainfall=4.77"

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Summary for Subcatchment 3S: Roof and Parking Areas

Runoff = 0.57 cfs @ 12.11 hrs, Volume= 2,161 cf, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.77"

	Area (sf)	CN	Description
*	4,130	98	ROOF AREA
*	1,595	98	PARKING
	5,725	98	Weighted Average
	5,725		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment 8S: Prop. Landscape

Runoff = 0.03 cfs @ 12.12 hrs, Volume= 107 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.77"

	Area (sf)	CN	Description
	1,045	61	>75% Grass cover, Good, HSG B
	1,045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1PP: Prop. Runoff

Inflow Area = 6,770 sf, 84.56% Impervious, Inflow Depth > 0.19" for 10-Year event

Inflow = 0.03 cfs @ 12.12 hrs, Volume= 107 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 107 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

Summary for Pond 3P: Infiltration System #1 & 2

Inflow Area = 5,725 sf, 100.00% Impervious, Inflow Depth > 4.53" for 10-Year event
 Inflow = 0.57 cfs @ 12.11 hrs, Volume= 2,161 cf
 Outflow = 0.07 cfs @ 12.67 hrs, Volume= 2,159 cf, Atten= 87%, Lag= 33.3 min
 Discarded = 0.07 cfs @ 12.67 hrs, Volume= 2,159 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 41.45' @ 12.67 hrs Surf.Area= 665 sf Storage= 592 cf

Plug-Flow detention time= 57.2 min calculated for 2,159 cf (100% of inflow)
 Center-of-Mass det. time= 56.3 min (806.3 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field A 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#2A	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#3C	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field C 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#4C	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#5B	40.00'	269 cf	11.00'W x 24.80'L x 3.50'H Field B 955 cf Overall - 281 cf Embedded = 673 cf x 40.0% Voids
#6B	40.50'	281 cf	ADS_StormTech SC-740 x 6 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard
 Storage Group C created with Chamber Wizard
 Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 38.50'
#2	Primary	43.40'	6.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.40' / 40.00' S= 0.0850 ' / ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.07 cfs @ 12.67 hrs HW=41.45' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.00 cfs)

80 Broadway - prop and exist II

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NRCC 24-hr D 25-Year Rainfall=6.03"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Roof and Parking Areas Runoff Area=5,725 sf 100.00% Impervious Runoff Depth>5.79"
Tc=5.0 min CN=98 Runoff=0.72 cfs 2,761 cf

Subcatchment8S: Prop. Landscape Runoff Area=1,045 sf 0.00% Impervious Runoff Depth>2.02"
Tc=5.0 min CN=61 Runoff=0.05 cfs 176 cf

Pond 1PP: Prop. Runoff Peak Elev=40.00' Storage=176 cf Inflow=0.05 cfs 176 cf
Outflow=0.00 cfs 0 cf

Pond 3P: Infiltration System #1 & 2 Peak Elev=41.95' Storage=815 cf Inflow=0.72 cfs 2,761 cf
Discarded=0.09 cfs 2,758 cf Primary=0.00 cfs 0 cf Outflow=0.09 cfs 2,758 cf

Total Runoff Area = 6,770 sf Runoff Volume = 2,937 cf Average Runoff Depth = 5.21"
15.44% Pervious = 1,045 sf 84.56% Impervious = 5,725 sf

80 Broadway - prop and exist II

NRCC 24-hr D 25-Year Rainfall=6.03"

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Summary for Subcatchment 3S: Roof and Parking Areas

Runoff = 0.72 cfs @ 12.11 hrs, Volume= 2,761 cf, Depth> 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.03"

	Area (sf)	CN	Description
*	4,130	98	ROOF AREA
*	1,595	98	PARKING
	5,725	98	Weighted Average
	5,725		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment 8S: Prop. Landscape

Runoff = 0.05 cfs @ 12.12 hrs, Volume= 176 cf, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=6.03"

	Area (sf)	CN	Description
	1,045	61	>75% Grass cover, Good, HSG B
	1,045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1PP: Prop. Runoff

Inflow Area = 6,770 sf, 84.56% Impervious, Inflow Depth > 0.31" for 25-Year event

Inflow = 0.05 cfs @ 12.12 hrs, Volume= 176 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 176 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

80 Broadway - prop and exist II

NRCC 24-hr D 25-Year Rainfall=6.03"

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Summary for Pond 3P: Infiltration System #1 & 2

Inflow Area = 5,725 sf, 100.00% Impervious, Inflow Depth > 5.79" for 25-Year event
 Inflow = 0.72 cfs @ 12.11 hrs, Volume= 2,761 cf
 Outflow = 0.09 cfs @ 12.76 hrs, Volume= 2,758 cf, Atten= 88%, Lag= 39.1 min
 Discarded = 0.09 cfs @ 12.76 hrs, Volume= 2,758 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2

Peak Elev= 41.95' @ 12.76 hrs Surf.Area= 665 sf Storage= 815 cf

Plug-Flow detention time= 73.6 min calculated for 2,752 cf (100% of inflow)

Center-of-Mass det. time= 72.7 min (818.3 - 745.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field A 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#2A	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#3C	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field C 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#4C	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#5B	40.00'	269 cf	11.00'W x 24.80'L x 3.50'H Field B 955 cf Overall - 281 cf Embedded = 673 cf x 40.0% Voids
#6B	40.50'	281 cf	ADS_StormTech SC-740 x 6 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group C created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 38.50'
#2	Primary	43.40'	6.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.40' / 40.00' S= 0.0850 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.09 cfs @ 12.76 hrs HW=41.95' (Free Discharge)↑**1=Exfiltration** (Controls 0.09 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=40.00' (Free Discharge)↑**2=Culvert** (Controls 0.00 cfs)

80 Broadway - prop and exist II

NRCC 24-hr D 100-Year Rainfall=8.62"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: Roof and Parking Areas Runoff Area=5,725 sf 100.00% Impervious Runoff Depth>8.37"
Tc=5.0 min CN=98 Runoff=1.03 cfs 3,995 cf

Subcatchment8S: Prop. Landscape Runoff Area=1,045 sf 0.00% Impervious Runoff Depth>3.92"
Tc=5.0 min CN=61 Runoff=0.10 cfs 341 cf

Pond 1PP: Prop. Runoff Peak Elev=40.00' Storage=341 cf Inflow=0.10 cfs 341 cf
Outflow=0.00 cfs 0 cf

Pond 3P: Infiltration System #1 & 2 Peak Elev=43.36' Storage=1,289 cf Inflow=1.03 cfs 3,995 cf
Discarded=0.12 cfs 3,990 cf Primary=0.00 cfs 0 cf Outflow=0.12 cfs 3,990 cf

Total Runoff Area = 6,770 sf Runoff Volume = 4,336 cf Average Runoff Depth = 7.69"
15.44% Pervious = 1,045 sf 84.56% Impervious = 5,725 sf

80 Broadway - prop and exist II

NRCC 24-hr D 100-Year Rainfall=8.62"

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Summary for Subcatchment 3S: Roof and Parking Areas

Runoff = 1.03 cfs @ 12.11 hrs, Volume= 3,995 cf, Depth> 8.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.62"

	Area (sf)	CN	Description
*	4,130	98	ROOF AREA
*	1,595	98	PARKING
	5,725	98	Weighted Average
	5,725		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment 8S: Prop. Landscape

Runoff = 0.10 cfs @ 12.12 hrs, Volume= 341 cf, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.62"

	Area (sf)	CN	Description
	1,045	61	>75% Grass cover, Good, HSG B
	1,045		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Pond 1PP: Prop. Runoff

Inflow Area = 6,770 sf, 84.56% Impervious, Inflow Depth > 0.60" for 100-Year event

Inflow = 0.10 cfs @ 12.12 hrs, Volume= 341 cf

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 40.00' @ 24.00 hrs Surf.Area= 1,000,000 sf Storage= 341 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.00'	5,000,000 cf	1,000.00'W x 1,000.00'L x 5.00'H Roadway Detention - Model

80 Broadway - prop and exist II

NRCC 24-hr D 100-Year Rainfall=8.62"

Prepared by Columbia Design Group

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Summary for Pond 3P: Infiltration System #1 & 2

Inflow Area = 5,725 sf, 100.00% Impervious, Inflow Depth > 8.37" for 100-Year event
 Inflow = 1.03 cfs @ 12.11 hrs, Volume= 3,995 cf
 Outflow = 0.12 cfs @ 12.79 hrs, Volume= 3,990 cf, Atten= 88%, Lag= 40.5 min
 Discarded = 0.12 cfs @ 12.79 hrs, Volume= 3,990 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 43.36' @ 12.79 hrs Surf.Area= 665 sf Storage= 1,289 cf

Plug-Flow detention time= 99.8 min calculated for 3,982 cf (100% of inflow)
 Center-of-Mass det. time= 98.8 min (839.0 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field A 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#2A	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#3C	40.00'	199 cf	11.00'W x 17.85'L x 3.50'H Field C 687 cf Overall - 189 cf Embedded = 498 cf x 40.0% Voids
#4C	40.50'	189 cf	ADS_StormTech SC-740 x 4 Inside #3 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
#5B	40.00'	269 cf	11.00'W x 24.80'L x 3.50'H Field B 955 cf Overall - 281 cf Embedded = 673 cf x 40.0% Voids
#6B	40.50'	281 cf	ADS_StormTech SC-740 x 6 Inside #5 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group C created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.00'	2.410 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 38.50'
#2	Primary	43.40'	6.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.40' / 40.00' S= 0.0850 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.12 cfs @ 12.79 hrs HW=43.35' (Free Discharge)↑**1=Exfiltration** (Controls 0.12 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=40.00' (Free Discharge)↑**2=Culvert** (Controls 0.00 cfs)

Appendix 'B'

HydroCAD Reports – separate cover